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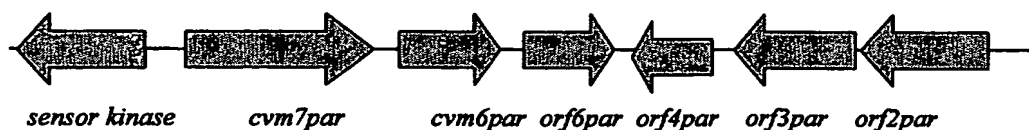
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(54) Title: NEW PROCESS FOR IMPROVING THE MANUFACTURE OF CLAVAMS E.G. CLAVULANIC ACID



(57) Abstract: New processes for improving the manufacture of clavams e.g. clavulanic acid. Novel DNA sequences and new microorganisms capable of producing increased amounts of clavulanic acid are also disclosed.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/004001

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12R1/465 C12P17/18 C12N15/76 C07K14/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12R C12N C12P C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, EMBL, WPI Data, BIOSIS, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98/33896 A (UNIV ALBERTA ; SMITHKLINE BEECHAM PLC (GB)) 6 August 1998 (1998-08-06) cited in the application the whole document	1-3, 6-10,12
A	LIRAS P ET AL: "CLAVULANIC ACID, A BETA-LACTAMASE INHIBITOR: BIOSYNTHESIS AND MOLECULAR GENETICS" APPLIED MICROBIOLOGY AND BIOTECHNOLOGY, SPRINGER VERLAG, BERLIN, DE, vol. 54, no. 4, 2000, pages 467-475, XP000998142 ISSN: 0175-7598 abstract page 472, column 2, paragraph 3 - page 474; figures 1-3	1-3, 6-10,12



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
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- \*O\* document referring to an oral disclosure, use, exhibition or other means
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\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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\*G\* document member of the same patent family

Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/004001

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MOSHER R H ET AL: "Genes specific for the biosynthesis of clavam metabolites antipodal to clavulanic acid are clustered with the gene for clavamate synthase 1 in Streptomyces clavuligerus" ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, AMERICAN SOCIETY FOR MICROBIOLOGY, WASHINGTON, DC, US, vol. 43, no. 5, May 1999 (1999-05), pages 1215-1224, XP002165205 ISSN: 0066-4804 cited in the application abstract page 1222, column 1, paragraph 3 - page 1223, column 1, paragraph 1 -----	1-3, 6-10,12
A	WO 01/30977 A (GREAVES PHILIP ANDREW ; GRIFFIN ALISON MICHELLE (GB); BARTON BARRY (GB) 3 May 2001 (2001-05-03) abstract; claims 1-10 -----	1-3, 6-10,12
P,A	WO 03/040372 A (ANDERS CECILIA ; JENSEN SUSAN (CA); UNIV ALBERTA (CA); GRIFFIN ALISON) 15 May 2003 (2003-05-15) -----	
A	WO 00/03581 A (MCNAUGHTON HEATHER JANE ; THIRKETTLE JAN EDWARD (GB); BARTON BARRY (GB) 27 January 2000 (2000-01-27) -----	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/004001

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3, 10 (complete), and 6-9, 12 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/004001

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